WHAT IS CLAIMED IS:

1. A method for determining mutual time difference between base station signals in an asynchronous code division multiplexing access (CDMA) system, the method comprising the steps of:

(a) measuring mutual time difference of signals transmitted between at least two base stations;

(b) determining all possible paths between said at least two base stations; and

(c) providing weights to the measured mutual time difference for said all possible paths.

2. The method as claimed in claim 1, wherein each of the signals transmitted between said at least two base stations is transmitted through a common pilot channel.

3. The method as claimed in claim 1, wherein step (a) comprises the substeps of:

sequentially measuring mutual time difference of the signals when received; and

averaging measurements of the mutual time difference, thereby obtaining an average of the measured time difference for the signals.

4. The method as claimed in claim 3, wherein step (a) further comprises a substep of determining an accuracy of the averaged measured time difference by means of a signal to noise ratio, so as to measure an error between the measured mutual time difference and the average of the measured mutual time difference.

5. The method as claimed in claim 3, wherein the average of the measured mutual time difference is compensated by subtracting a difference of

delays at line of sight signal from the average of the measured mutual time difference, said line of sight signal propagating between said at least two base stations.

6. The method as claimed in claim 5, wherein the difference of delays at line of sight signal is obtained by equations,

$$\tau_{i->k} = \frac{\sqrt{(x_i - x_k)^2 + (y_i - y_k)^2 + (z_i - z_k)^2}}{c} \text{ and}$$

$$\tau_{j->k} = \frac{\sqrt{(x_j - x_k)^2 + (y_j - y_k)^2 + (z_j - z_k)^2}}{c}, \text{ in which}$$

c is the light speed, a first base station coordinates with x_i, y_i, z_i, a second base station coordinates with x_j, y_j, z_j, and a location measurement unit coordinates with x_k, y_k, z_k.

7. The method as claimed in claim 1, wherein step (a) comprises the substeps of:

(1) receiving information about adjusted time difference and the accuracy;

(2) forming a set of all possible paths between said at least two base stations;

(3) for each path of each formed set, forming a path vector listing the adjusted time differences of signals of the base station included in this path and determining a metric of the path vector;

(4) selecting a group of path vectors for each pair of base stations from the set of all possible path vectors of this pair of base stations, wherein the selected group of the path vectors contains each of the obtained adjusted time differences;

(5) forming weights of the adjusted time differences of signals of base stations for each pair of base stations using the selected group of path vectors of

these base stations and obtained accuracies of the adjusted time differences of signals of the base stations; and

(6) determining a mutual time difference of signals of each pair of base stations as a weighted sum of all adjusted time differences of signals of base stations, wherein the weights of the adjusted time difference of signals of the base stations formed for the pair of base stations are used as weights.

8. The method as claimed in claim 1, wherein the measured mutual time difference of signals and its accuracy are transmitted through one of said at least two base stations to a base station controller.

9. The method as claimed in claim 1, wherein the measured mutual time difference of signals and its accuracy are transmitted from the base station controller to a mobile user location center for calculating the mutual time difference of the signals.

10. The method as claimed in claim 7, wherein, in step (4), a number of applications of each obtained adjusted time difference of the selected group of path vectors does not exceed a number of applications of this adjusted time difference of any other group of path vectors obtained from the set of all possible path vectors, and values of path vector metrics of the selected group do not exceed values of path vector metrics of any other path vector group obtained from the set of all possible path vectors.

11. The method as claimed in claim 1, wherein said all possible paths refer to paths between base stations adjacent to a terminal which is an object of the measurement.

12. The method as claimed in claim 11, wherein the paths between the base stations adjacent to the terminal include non-line-of-sight multipaths.

13. The method as claimed in claim 1, wherein, for said all possible paths, the weights are provided according to errors of the measured mutual time differences.

14. An apparatus for determining mutual time difference between base station signals in an asynchronous code division multiplexing access (CDMA) system, the apparatus comprising:

a location measurement unit for measuring mutual time difference of signals transmitted between at least two base stations;

a mobile user location center for receiving the mutual time difference of the signals measured by the location measurement unit, determining all possible paths between said at least two base stations, and providing weights to the measured mutual time difference for said all possible paths.

15. The apparatus as claimed in claim 11, wherein each of the signals transmitted between said at least two base stations is transmitted through a common pilot channel.

16. The apparatus as claimed in claim 11, wherein the location measurement unit sequentially measures mutual time difference of the signals when received, and averages measurements of the mutual time difference, thereby obtaining an average of the measured time difference for the signals.

17. The apparatus as claimed in claim 13, wherein the location measurement unit determines an accuracy of the averaged measured time difference by means of a signal to noise ratio, so as to measure an error between the measured mutual time difference and the average of the measured mutual time difference.

18. The apparatus as claimed in claim 13, wherein the location measurement unit compensates the average of the measured mutual time difference by subtracting a difference of delays at line of sight signal from the average of the measured mutual time difference, said line of sight signal propagating between said at least two base stations.

19. The apparatus as claimed in claim 15, wherein the location measurement unit calculates the difference of delays at line of sight signal by means of equations,

$$\tau_{i->k} = \frac{\sqrt{(x_i - x_k)^2 + (y_i - y_k)^2 + (z_i - z_k)^2}}{c}$$ and

$$\tau_{j->k} = \frac{\sqrt{(x_j - x_k)^2 + (y_j - y_k)^2 + (z_j - z_k)^2}}{c}$$, in which

c is the light speed, a first base station coordinates with x_i, y_i, z_i, a second base station coordinates with x_j, y_j, z_j, and a location measurement unit coordinates with x_k, y_k, z_k.

20. The apparatus as claimed in claim 11, wherein the mobile user location center performs:

receiving information about adjusted time difference and the accuracy;

forming a set of all possible paths between said at least two base stations;

for each path of each formed set, forming a path vector listing the adjusted time differences of signals of the base station included in this path and determining a metric of the path vector;

selecting a group of path vectors for each pair of base stations from the set of all possible path vectors of this pair of base stations, wherein the selected group of the path vectors contains each of the obtained adjusted time differences;

forming weights of the adjusted time differences of signals of base stations for each pair of base stations using the selected group of path vectors of these base stations and obtained accuracies of the adjusted time differences of signals of the base stations; and

determining a mutual time difference of signals of each pair of base stations as a weighted sum of all adjusted time differences of signals of base stations, wherein the weights of the adjusted time difference of signals of the base stations formed for the pair of base stations are used as weights.

21. The apparatus as claimed in claim 11, wherein the location measurement unit transmits the measured mutual time difference of signals and its accuracy through one of said at least two base stations to a base station controller.

22. The apparatus as claimed in claim 18, wherein the mobile user location center receives the measured mutual time difference of signals and its accuracy from the base station controller.

23. The apparatus as claimed in claim 17, wherein in selecting a group of path vectors, the mobile user location center prevents a number of applications of each obtained adjusted time difference of the selected group of path vectors from exceeding a number of applications of this adjusted time difference of any other group of path vectors obtained from the set of all possible path vectors, and prevents values of path vector metrics of the selected group from exceeding values of path vector metrics of any other path vector group obtained from the set of all possible path vectors.

24. The apparatus as claimed in claim 14, wherein said all possible paths refer to paths between base stations adjacent to a terminal which is an object of the measurement.

25. The apparatus as claimed in claim 24, wherein the paths between the base stations adjacent to the terminal include non-line-of-sight multipaths.

26. The apparatus as claimed in claim 14, wherein, for said all possible paths, the weights are provided according to errors of the measured mutual time differences.